Western Mining Action Project – Complaint and Request for Investigation

Pipeline Infiltration Project

December 21, 2004

Executive Summary

The following report summarizes the activities and investigation completed by the Nevada Division of Environmental Protection (NDEP) in response to a written submittal from Western Mining Action Project on behalf of Great Basin Mine Watch and the Western Shoshone Defense Project (GBMW/WSDP). The submittal of July 13, 2004 is titled Complaint and Request for Investigation – Pipeline Infiltration Project ("Complaint"). The Pipeline Infiltration Project (PIP) is comprised of multiple earthen basins and conveyance piping which are utilized to infiltrate dewatering water from the Pipeline Project. The Pipeline Project is an open pit gold mine and process facilities located in Crescent Valley, Nevada. The facilities are owned and operated by Cortez Joint Venture, dba. Cortez Gold Mines("Permittee").

In addition to the summary, this report contains a list of the allegations as extracted from the Complaint, a chronology of events, a review of conclusions and findings, a set of recommendations, and an appendix of related information and data. This report is considered 'Enforcement Confidential' until such time the report is finalized and ultimately made a public record.

The Complaint alleges that "the infiltration basins at the Pipeline Infiltration Project are leaching salts and nitrates that are present in shallow soil layers and then carrying the leached salts into the underlying groundwater", resulting in many monitoring wells yielding nitrate and TDS levels several times the drinking water standards. The Complaint asserts that GBMW initially raised these concerns during the NDEP renewal of Water Pollution Control Permit NEV95111 in 2001, but that GBMW chose not to appeal the permit renewal because it believed that further recharge at the infiltration basins would not increase any already existing degradation. However, the Complaint alleges that data collected since 2001 indicate degradation is continuing, and in some cases increasing, as referenced in an attached technical memorandum prepared by Tom Myers. Lastly, the Complaint requested that the NDEP investigate the PIP and respond with a report regarding its findings and any proposed actions.

The NDEP is serious in its duty to protect Nevada's groundwater. To this end, the Division is appreciative of any public concerns regarding potential degradation of waters of the state. In response to the received Complaint, all monitoring reports on file for WPC Permit NEV95111 were re-examined by the NDEP, additional data was requested and obtained from the Permittee, field inspections were conducted of the facilities, meetings were held with the Permittee to review performance of the respective infiltration sites, data was compiled, and a thorough and independent evaluation was completed by the NDEP for each PIP infiltration site.

The findings of the investigation determined that the fenceline of monitoring wells completed within the previously established groundwater table downgradient of the infiltration facilities, did not have any exceedences of the NDEP Profile I water standards. As such, the allegation that the Pipeline Infiltration Project was causing a contaminant plume that is migrating offsite to adversely impact drinking water users was not substantiated.

The investigation did identify that there have been, and still remain, exceedances within the mounded infiltration water which temporarily resides directly beneath the infiltration basins, but above the pre-existing ambient groundwater table. The submitted Complaint makes reference to many of these wells. However, it is the NDEP's determination that the infiltration waters which temporarily occupy the prior vadose zone, do not constitute a source of usable drinking water. Rather, it is the ambient, pre-existing groundwater table which has the potential to be an underground source of drinking water; and as such, it is that groundwater table the NDEP is charged with protecting and to which water quality compliance is applied.

Given this compliance focus, the investigation did identify that two of the eleven PIP infiltration sites have exceedances in the pre-existing groundwater, directly beneath or beyond the mound of infiltrated water. However, it is important to note that both sites, Filippini and Frome, are no longer active as use of these two sites for infiltration purposes was previously ceased by the Permittee. The resulting infiltration water at both the Filippini and Frome sites appears to stagnate within a localized area and is not considered to have potential to negatively impact any drinking water sources. Groundwater monitoring will be retained at these two sites to ensure delineation and characterization of the areas with exceedances.

This investigation resulted in numerous recommendations, both for agency and facility actions.

Recommended actions for the NDEP include the following:

- Monitoring requirements in WPC Permit NEV95111 should be revised to clearly identify those wells that are utilized for groundwater quality compliance purposes. Monitoring requirements for those wells residing within the infiltration water mound that are utilized solely for determining infiltration performance should be modified to more appropriately monitor for water level. Monitoring requirements at the Frome site should be reinstated for IM-3D, IM-25D and IM-26D.
- The modified WPC Permit could also include an expressed limit to specifically prohibit any future infiltration at the Frome site.
- The WPC Permit should also be modified to include the establishment of a Schedule of Compliance item requiring that if the Permittee determines to proceed with the Rocky Pass III infiltration site, the groundwater gradient in that area will be re-evaluated for appropriate monitoring well locations.
- In order to clearly establish the pre-existing groundwater level and quality, future NDEP permitting of infiltration systems should ensure that monitoring data be obtained and submitted to the NDEP from both upgradient and downgradient monitoring wells, prior to commencement of any infiltration operations.
- Lastly, the NDEP should provide careful consideration during the permitting process to ensure that all monitoring wells are appropriately screened in the upper level of the established groundwater table and that the wells are properly sited in lateral distance from the respective infiltration basins, including at least one upgradient and two downgradient monitoring wells.

Recommended actions of the Permittee at the Pipeline Infiltration Project include:

- Installation of additional <u>downgradient</u> monitoring wells, appropriately screened in the upper level of the pre-existing groundwater table, at the Frome, North Highway, West Highway, Windmill II, and Windmill IV infiltration sites.
- Installation of new groundwater monitoring wells <u>upgradient</u> of mounded infiltration water at the Frome, North Highway, and Rocky Pass I infiltration sites.

- Due to the apparent failure of the well casing, monitoring well IM-18D at the Rocky Pass I infiltration site should be properly abandoned.
- Existing piping should be removed from the Frome Site to ensure dewatering water can no longer be discharged in that area.
- Installation of an additional groundwater monitoring well upgradient of FMW-07S. Although below the standard, an increasing trend of nitrate is noted at fence monitoring well FMW-07S, and while there has been no indication that the nitrate trend is related to any specific infiltration operation, additional delineation is suggested at this time.
- Lastly, in the event the Permittee determines to proceed with proposed plans for the Rocky Pass III infiltration site, one upgradient and two downgradient monitoring wells, screened in the upper level of the pre-existing groundwater table, should be installed and the collected monitoring results submitted to the NDEP prior to initiating any infiltration operations.

In conclusion, the results of the Pipeline Infiltration Project Investigation did not substantiate the allegation that contaminants in groundwater are moving off site. Monitoring wells at the currently active infiltration sites with constituent levels, namely TDS and nitrate, above the NDEP Profile I water standards, are all located within the mounded infiltration water that temporarily resides above the pre-existing groundwater table. The NDEP has determined that such water does not constitute a source of usable water; and as such, compliance is focused upon potential degradation of the pre-established groundwater table. The investigation did identify that exceedances are present in the pre-established groundwater table at two infiltration sites, Filippini and Frome; however, these two sites are no longer in operation and the affected groundwater is localized by low transmissivity soils with no apparent potential for migration that could adversely impact reasonable use of groundwater in the area. It was evident from the investigative review of the Pipeline Infiltration Project files, that the PIP has evolved over its operating history as both the Permittee and the NDEP have gained experience from the system's performance. However, the investigation did identify that further improvements could be made in the existing permitting and monitoring systems, as resulting recommendations were made for respective actions both of the NDEP and of Cortez Gold Mines as the Permittee. The progressive implementation of the resulting investigation recommendations should provide additional measures to substantiate that neither current, nor future drinking water sources, are not being degrading by the PIP operations.

This investigation report shall be submitted to the NDEP administration for the appropriate conveyance to the interested parties and for implementation of the recommended actions as may be deemed appropriate.

Summary of Allegations

The written Complaint received by the Division on July 13, 2004, is stated to have been submitted by Western Mining Action Project (WMAP) on behalf of Great Basin Mine Watch (GBMW) and Western Shoshone Defense Project (WSDP). The WMAP Complaint and Request for Investigation is comprised of seven pages with various allegations and was signed by Nicole Rinke as the attorney for GBMW and WSDP. Also referenced and included with the submitted Complaint was a Technical Memorandum from Tom Myers to GBMW and WSDP dated July 12, 2004. For brevity and clarity, only those claims extracted from the Complaint signed by Ms. Rinke are summarized here:

1. "…the infiltration basins at the PIP are leaching salts and nitrates that are present in the shallow soil layers and carrying them into the underlying groundwater. As a result, at many groundwater wells in the area nitrates and TDS levels exceed drinking water standards by more than several times."

2. "…, data that have been collected since 2001 indicate that in fact the degradation is continuing and, in some cases, increasing."

3. "The degradation of groundwater the PIP is causing patently violates Nevada's strict prohibition against groundwater contamination. NRS 445A.490 provides, in part, that 'no permit may be issued which authorizes any discharge or injection of fluids through a well into waters of the state…which would result in the degradation of existing or potential underground sources of drinking water'."

4. "In groundwater wells at the PIP, nitrate levels reach as high as 200mg/l. … the elevated levels of nitrate present in the groundwater as a result of the PIP clearly violate Nevada's prohibition against groundwater contamination."

5. "In groundwater wells at the PIP, TDS levels far exceed both of these standards, reaching as high as 5,000mg/l."

6. "…although the affected groundwater is not currently used for public drinking water supplies, there are several privately owned domestic drinking water wells currently drawing from the affected aquifer. Several owners of these wells have expressed great concern regarding the future quality of their drinking water as a result of the PIP."

7. "…the data indicates that the contaminants are likely moving off-site…with the passage of time, the range of the affected area will probably also increase."

Note: Although too numerous to reasonably include here, the comments and claims made within the technical memorandum provided by Tom Myers were also reviewed and considered by the NDEP in the course of the investigation as each infiltration site was thoroughly reviewed and evaluated.

Relevant Chronology for the Pipeline Infiltration Project Investigation

July 13, 2004 NDEP received phone inquiry from the Elko Daily Free Press, requesting comment on the GBMW Complaint. The newspaper emailed a copy of the Complaint since the NDEP had not received it. Later, the NDEP receives hand-delivered copy of the WMAP Complaint & Investigation Request.

July 14, 2004 Meeting with NDEP management to outline intended actions in response to the received Complaint.

July 19, 2004 Investigation kick-off meeting held with BMRR investigation staff to establish the scope of proposed actions for the investigation. Assigned responsibilities for review of the received Complaint and file data to assist in making preliminary determinations.

July 21, 2004 Meeting of BMRR staff to evaluate findings resulting from initial review of the received Complaint. Developed proposed investigation plan and respective memo provided to NDEP management.

July 26, 2004 Meeting with BMRR Bureau Chief to review potential monitoring program issues. Contacted BWPC for information on public drinking wells.

Aug. 10, 2004 Investigation status meeting with NDEP management. Highlighted that many of the existing monitoring wells were located within the infiltrated mound water to track infiltration performance. Concurred that permitting should clearly establish those wells, up and downgradient of the basins, that are completed within the pre-existing groundwater table, to be used for compliance monitoring.

Aug. 10, 2004 NDEP issued written request to Cortez Gold Mine for submittal of available monitoring data.

Aug.17-23 Cortez Gold sends electronic files for PIP monitoring well data.

Aug. 30, 2004 Meeting at NDEP with Cortez Gold Mine representatives to review operational history of the various infiltration sites and resulting monitoring results.

Sept. 13, 2004 Investigation review meeting with NDEP management, discussed data review and initial findings.

Sept. 14, 2004 BMRR compliance inspector makes field inspection of the Pipeline Infiltration Project.

Oct. 20, 2004 Investigation review meeting with NDEP management. Provided status memo and denoted bigger effort than initially anticipated for complete data review.

Oct. 22, 2004 NDEP receives letter from WMAP inquiring status of the investigation for the PIP Cmplaint.

Oct. 25, 2004 NDEP management visits Pipeline Project.

Oct. 27, 2004 NDEP reply letter mailed to WMAP, confirming investigation is ensuing and level of effort made.

Nov. 1, 2004 BMRR internal memo issued regarding comprehensive review of monitoring data.

Nov. 4, 2004 Investigation members hold data review meeting and develop preliminary recommendations.

Nov. 15, 2004 Summary completed of various technical guidance documents reviewed during the investigation.

Nov. 22, 2004 Joint field inspection of Pipeline Infiltration Project sites conducted by NDEP investigation team. Communicated to Cortez staff the importance of providing appropriate upgradient and downgradient monitoring results for pre-existing groundwater table, prior to initiating any infiltration operations.

Dec. 2, 2004 Investigation information compiled and draft report initiated.

Dec. 21, 2004 Investigation report drafted for NDEP internal review.

Conclusions/Findings

The specific findings and conclusions resulting from the NDEP investigation of the submitted Complaint are summarized below. The Complaint determinations are sequenced respective to the items enumerated in the Summary of Allegations. Additionally, findings are provided in the second section respective to NDEP's evaluation of each infiltration facility at the Pipeline Infiltration Project.

Complaint/Allegation Findings: (*Allegations made in the Complaint, as listed on page 3, are paraphrased here in italics)*

1. Allegation: *Infiltration basins at the PIP are leaching salts and nitrates into the underlying groundwater…many groundwater wells exceed drinking water standards.*

   Finding: The operational experience at the PIP has both recognized and responded to the potential for infiltrated water to mobilize constituents from the shallow soil zones. Although the dewatering water is of good water quality (meets all NDEP Profile I standards), preliminary tests and modeling projected there would be a flush of constituents from within the alluvium into the temporary infiltration mound upon introduction of the dewatering water. In an effort to reduce the magnitude of this flush, the design for more recent infiltration basins has been modified to create deeper basins and thus avoid water contact with the region of highest salt concentration near the soil surface. It is critical to note that the majority of monitoring well data reported from the PIP is obtained from relatively shallow wells that are screened within the mound of water caused by the infiltration operations; and not from true groundwater monitoring wells screened in the pre-existing or ambient groundwater table. It is the NDEP's determination that the mounded infiltration water is transitory in nature and unavailable in sufficient yield to be a source of usable water. The infiltration water while in the process of infiltrating is not a potential underground source of drinking water. Rather, it is the ambient, pre-existing groundwater that has the potential to be an underground source of drinking water, and it is this groundwater that the NDEP is charged with protecting under NRS 445A.490. All infiltration water mounds at the PIP are fully confined within the project boundary, and the NDEP has determined that the infiltration water is not degrading an existing or potential underground source of drinking water. It is recognized that the transient infiltration water may eventually combine with the ambient pre-existing groundwater which could be, or at a future date become, a source of usable groundwater. As such, after the last permit renewal, fenceline monitoring wells were installed within the pre-existing groundwater table, downgradient of the projected mounded water from the infiltration basins. Monitoring data from these wells have reported no exceedance of the Division Profile I water standards. However on a localized basis, degradation is noted in IM-13 at the former Filippini site, and in IM-23D, IM-24D and IM-25D at the inactive Frome site. Additional monitoring wells are specifically recommended in these two areas to better monitor and characterize the localized groundwater quality.

2. Allegation: *Degradation is continuing and, in some cases, increasing.*

   Finding: Those areas noted to have continued or increasing elevation of constituents are either located within active infiltration water mounds, or within stagnant groundwater at the discontinued Filippini and Frome sites. As noted above, increasing trends may be initially anticipated within the mounded infiltration water for newly active infiltration basins. No data, as measured in true groundwater monitoring wells downgradient of the PIP facilities, substantiated the claimed increasing trend of exceedances in groundwater quality. In fact, data from the problematic sites at Filippini and Frome sites, as referenced in Findings 4 & 5

below, indicate that levels generally peaked in groundwater at these facilities in 1998-1999 and have since been reducing in concentration.

3. Allegation: *The degradation of groundwater that the PIP is causing violates Nevada's strict prohibition against groundwater contamination.*

   Finding: For the purpose of environmental permitting and compliance monitoring, it has been, and remains, the NDEP's determination that infiltration water which temporarily occupies the prior vadose zone, does not constitute a source of usable drinking water. While it is well recognized that there is a benefit in returning dewatering water back into the same basin in which it was removed such that it can be available for future use; it is also recognized that transport of that water through the alluvium may have the potential to transit some constituents. As such, in determining if degradation may, or is, occurring; it is critical to establish compliance points at the upper level of the pre-established groundwater table the NDEP is charged to protect. The mounded water that temporarily resides above this pre-existing or ambient groundwater table due to surface infiltration operations, will not reasonably remain isolated and be available within that subsurface zone for use after the infiltration ceases. As such, it would be unreasonable to consider temporary exceedances within an infiltration mound to constitute groundwater degradation. However, a temporary exceedance noted during the infiltration process may reasonably create a concern and may trigger further monitoring as has occurred, and continues with the PIP.

4. Allegation: *In groundwater wells at the PIP, nitrate levels reach as high as 200 mg/l.*

   Finding: Nitrate can be a common constituent of concern with infiltration operations. While nitrate levels have generally been elevated within the mounds of infiltration water directly under the basins, nitrate levels measured in wells within the pre-existing ambient groundwater downgradient of the basins have not exceeded the 10mg/l drinking water standard, except for the inactive sites at Filippini (IM-13) and Frome (IM-25D). However, even these noted exceedances were an order of magnitude less than that cited in the Complaint. The Filippini nitrate level peaked in IM-13 at a concentration of 25.5 mg/l in June 1999, and it was recently measured in August 2004 at 0.79mg/l. A similar condition was noted at the Frome site, where nitrate peaked in IM-25D at a level of 21.2 mg/l in January 1998, and was measured in July 2001 at 1.1 mg/l. Directly downgradient, the fenceline of monitoring wells have not indicated migration of elevated nitrate in groundwater.

5. Allegation: *In groundwater wells at the PIP, TDS levels exceed standards, reaching as high as 5,000mg/l.*

   Finding: Total dissolved solids (TDS) have been elevated within the mounded infiltration water zones near the basins as would be expected for infiltration operations. Evaluation of the monitoring data indicates the TDS standard of 1000mg/l has not been exceeded in any of the fence of true groundwater wells downgradient of the PIP facility, but that TDS exceedances have occurred and, to a lesser degree, still remain in groundwater wells at the former Filippini site (IM-13) and the inactive Frome site (IM-23D, 24D & 25D). The Filippini TDS peaked in IM-13 during June 1999 at a concentration of 11,400 mg/l, and it was recently measured in August 2004 at 3850 mg/l. TDS levels at the Frome site were not as severe as values peaked in IM-23D during October 1997 at 1760mg/l and was respectively measured in June 2004 at 1320mg/l; IM-24D peaked at 2000 mg/l TDS in May 1998 and was measured at 1160 mg/L in June 2004; and IM-25D peaked at 2560 mg/L in January 1998 and was below the TDS standard in July 2001 at 720mg/l.

6. Allegation: *There are several privately owned domestic drinking water wells currently drawing from the affected aquifer.*

   Finding: The NDEP is unaware of any private party using mounded infiltration water in the immediate area of the infiltration basins as a source of drinking water. Nor are any domestic wells drawing from groundwater located at the Filippini and Frome sites. The nearest private wells to the PIP facilities are at the Dean Ranch and Wintle Ranch, both of which are owned by the Permittee. These wells are routinely monitored and have met, and continue to meet, all Division Profile I water standards. The nearest public drinking water system draws from source water upgradient of the mine facilities. As such, the investigation could not substantiate the Complaint allegation that there are domestic drinking water wells drawing from the affected groundwater.

7. Allegation: *The contaminants are likely moving off-site… the range of the affected area will probably increase.*

   Finding: Infiltrated water is acknowledged to have the potential to transport mobile constituents. However, it is the NDEP's objective that analytes liberated near-surface do not reach the ambient groundwater table in a manner that degrades groundwater quality beyond the Profile I water standard. While the total projected area of the infiltrated water mounds can be anticipated to increase with the construction of additional infiltration basins, the Division's focus is to ensure that the infiltration operations do not result in degradation of the pre-existing groundwater aquifer. The current data does not substantiate the concept of a contaminant plume moving outside of the project boundary; and in fact, the existing fence of downgradient groundwater monitoring wells indicates no groundwater degradation has resulted from the infiltration operations.

It should be noted that the PIP is a relatively large infiltration project comprised of up to sixty-five basins at thirteen infiltration sites and over seventy monitoring wells. In the course of completing the PIP investigation, staff of the Bureau of Mining Regulation & Reclamation (BMRR) reviewed the site monitoring data and made a supplemental evaluation of each respective infiltration area at the PIP. Brief descriptions of the existing monitoring systems are summarized below.

Infiltration Evaluation Findings:

I. Highway Infiltration Site: Upgradient monitoring is provided by IM-1, and although it is intermittently dry, the background groundwater quality has been established. Downgradient monitoring, as provided by IM-3D, IM-5D and IM-10, are sufficient for monitoring under the infiltration mound downgradient of the Highway basins and upgradient of the former Filippini Site. No groundwater degradation noted in the monitoring data and no further suggestions or findings.

II. North Highway Infiltration Site: Although no site specific upgradient well is being monitored, the upgradient groundwater quality for the general area was previously determined by the Highway IM-1 and USGS wells. Presently, no groundwater-only monitoring wells exist downgradient of these basins and upgradient of the Filippini site. Consideration is suggested for the installation of a dedicated upgradient monitoring well. It is recommended that a new well, screened entirely below the estimated level of the pre-infiltration water table, be installed downgradient of the North Highway Site.

III. South Highway Site: Similar to North Highway, a site specific upgradient groundwater well is not being monitored; however, the upgradient groundwater quality was previously established by the Highway IM-1 and USGS wells. Downgradient monitoring is provided by IM-10. No degradation noted in groundwater monitoring data and no further suggestions or findings.

IV. West Highway I & II Sites: These infiltration sites were previously approved, but have not yet been fully constructed. Upgradient groundwater monitoring is provided by SMA-10. The proposed downgradient monitoring includes existing wells IM-10, IM-14, IM-34S & IM-34D, plus proposed new monitoring wells IM-59S & IM-59D, IM-60S & IM-60D, IM-61S & IM-61D. IM-10 is screened in groundwater only and is acceptable for downgradient monitoring, but IM-14 is a mixed mound/groundwater well, IM-34S is a moundwater-only well, and IM-34D was drilled after the Highway I infiltration began, so it is unclear whether it is monitoring groundwater, moundwater, or a mixture of the two. As such, IM-14, IM-34S and IM-34D are not acceptable for downgradient groundwater monitoring. Additionally, the proposed new well locations are all located in close proximity to the infiltration basins and will presumably be within the immediate area of the infiltration mounds. Therefore, it is recommended that a new fenceline well be installed south of IZ-18 to provide a proper groundwater compliance point downgradient of the West Highway Infiltration site.

V. Filippini Site: Degradation of groundwater at this location is documented at IM-13. However, infiltration at Filippini ceased between late 1998 and early 1999. The site was closed and reclaimed, and the low permeability of the near surface sediments is believed to be inhibiting any significant migration of contaminants. Downgradient groundwater monitoring wells were installed in January 2000 at IZ-18, IZ-19, and IZ-20, followed by installation of FMW-06S in December 2002. These wells are all located outside of the downgradient edge of the infiltrated water mound and they now serve as sentinel wells to monitor for any downgradient contaminant migration. To date, the sentinel wells have exhibited no exceedances of the Profile I standards.

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VI. Frome Site: Degradation of groundwater at this location is documented at IM-23D, IM-24D, and IM-25D, and currently consists solely of low-level TDS exceedances. Of the twenty-one infiltration basins initially constructed at the Frome site, sixteen have been closed and reclaimed. At least twelve basins were closed in 1998, within one year of the onset of initial operation. The five remaining basins were deactivated in March 2004. The Permittee has expressed an interest in retaining the remaining basins for use as emergency event ponds. However, given the noted groundwater exceedances, it is recommended that the remaining basins be permanently closed and reclaimed as soon as possible. Additional monitoring wells in ambient groundwater should be installed both upgradient of the basins and downgradient of IM-23D, IM-24D and IM-25D, to further delineate the extent of degradation and/or provide additional sentinel monitoring.

VII. Rocky Pass I & II, and Windmill I, II, IV &V Sites: Since these infiltration facilities have been constructed in the same general vicinity, the infiltration performance was evaluated collectively. Review of the existing monitoring wells determined that no groundwater-only monitoring wells currently exist, either upgradient or immediately downgradient, as desired for consistent compliance monitoring. However, IM-20 is an upgradient mixed mound/groundwater well which has had only minor exceedances for Mn and Sb. While it could be extrapolated that groundwater is likely not degraded if the overlying mixed mound and groundwater has no exceedances, such that IM-20 could continue to serve as a proxy

for an upgradient groundwater well provided it continues to have no exceedances, it is recommended that consideration be provided for the installation of a dedicated upgradient groundwater-only monitoring well now, in order to prevent any potential future question. Additionally, two downgradient groundwater-only monitoring wells are recommended for installation in the vicinity of the moundwater wells at IM-41 and IM-42. All new wells must be conservatively screened to ensure they are collecting representative groundwater from under the pre-infiltration water table. Data also indicates that the moundwater well IM-18D has likely experienced a casing failure. As such, this well should be properly plugged and abandoned.

VIII. Rocky Pass III: This infiltration site was previously approved by the NDEP, but a construction schedule has not yet been determined. The Permittee is withholding construction until such time that it is determined if there is a need for the additional capacity. Monitoring proposed by the Permittee includes two existing upgradient wells at RP-01 and RP-02, two existing downgradient wells at RP-03 and IM-49, and proposed new downgradient monitoring wells at IM-57S & IM-57D, and IM-58S & IM-58D. RP-01 and RP-02 have screen intervals that extended several feet above the ambient water table at the time of drilling. Therefore, if infiltration moundwater from the Rocky Pass II/III sites migrate into the area of these wells, they will become mixed mound/groundwater wells. RP-03 is a mixed mound/groundwater well that cannot be used as a groundwater monitoring well. It has not been determined if IM-49 is screened entirely within the pre-infiltration groundwater table. Additionally, the proposed new wells are very close in lateral proximity to the proposed new Rocky Pass III infiltration basins and questions remain as to what the actual groundwater gradient might eventually be in this area following construction, due to potential influences from the Rocky Pass and Windmill infiltration mounds. As such, it is recommended that at least three new wells, screened entirely within the ambient pre-existing groundwater table, be installed (one upgradient and two downgradient) based on the groundwater gradient as modified by the existing and future infiltration operations.

Recommendations

It should be acknowledged that the NDEP is appreciative of any public expressed concerns for potential groundwater degradation and equally that the NDEP is serious in its efforts to protect Waters of the State. As such, a thorough and independent evaluation was conducted by the NDEP in response to the received WMAP Complaint and Request for Investigation, which resulted in numerous recommendations as summarized below:

1. Many of the allegations in the Complaint and adjoining technical memorandum reference monitoring results at locations that are within the mounded water created in the prior vadose zone as a result of the infiltration operations, and not from true groundwater monitoring within the ambient, pre-existing groundwater table. The Pipeline Infiltration Project has evolved significantly over its operating history as both the NDEP and the Permittee have gained a better knowledge of the system's performance from the comprehensive network of 'in-mound' monitoring. However, with the benefit of current knowledge, much of the potential concern over groundwater degradation could have been reduced if compliance monitoring points had been more clearly established and communicated. As such, the Division should ensure that permitting of infiltration systems consistently includes delineation of compliance monitoring wells, at least one upgradient and two downgradient, that are appropriately screened entirely within the upper zone of the pre-existing, ambient groundwater table. Furthermore, in order to adequately establish the respective groundwater quality and elevation, sufficient monitoring samples should be obtained from these compliance monitoring wells prior to the initiation of any infiltration operations.

2. Degradation in groundwater has been established at the former Filippini Site, as noted by monitoring data for IM-13, and at the currently inactive Frome Site, as noted by monitoring data from IM-23D, IM-24D and IM-25D. No infiltration has occurred at the Filippini Site since 1999 and the impacted groundwater appears to be localized by the low transmisivity soil in this area. Similarly, the groundwater gradient at the Frome Site is expected to be very low, thereby hindering any typical efforts for a remedial capture system (pump & treat), but also reducing the risk of any significant constituent migration. The groundwater quality is generally improving and further potential for contamination is eliminated by the full closure of both sites. Additional monitoring wells should be established in groundwater both upgradient of the Frome basins and downgradient of the above-referenced Frome wells to verify the localized extent of contamination and to provide a sentinel monitoring mechanism by which to identify if remedial or additional monitoring efforts may be warranted.

3. Additional monitoring wells, screened in the upper level of the ambient groundwater table, should be installed at the PIP for compliance monitoring at the following locations: upgradient of North Highway, downgradient of North Highway, downgradient of West Highway (south of IZ-18), upgradient of Rocky Pass I, downgradient of Windmill II & Windmill IV sites (2 wells near IM-41 & IM-42), upgradient of the proposed Rocky Pass III, and downgradient of the proposed Rocky Pass III (2 wells). All new monitoring well locations and screen intervals should be reviewed and approved by the NDEP prior to installation.

4. The BMRR should revise Section I.D of Water Pollution Control Permit NEV95111 to clearly identify those wells that are being monitored for water quality compliance purposes. Other wells that are being monitored to determine infiltration performance should respectively be required in the Permit to report for depth or water elevation, and not a full analytical suite. Additionally, quarterly water quality monitoring should be reinstated in the Permit for groundwater wells IM-3D, IM-25D and IM-26D at the Frome site, and a permit limit applied that no further water shall be introduced to the Frome infiltration facility. Lastly, the Permit should be modified to include a Schedule of Compliance item, stipulating that if the Permittee determines to proceed with proposed plans for the Rocky Pass III facility, then the groundwater gradient will be re-evaluated and appropriate compliance monitoring wells established prior to initiating any respective infiltration operations.

5. Sampling results from monitoring well IM-18D at Rocky Pass I are indicative of a failed well casing. Therefore, this well should be properly abandoned and replaced, and the respective monitoring requirements removed from the Permit.

6. Playa monitoring well FMW-07S is yielding an increasing trend in nitrate concentration. While a water standard exceedance has not yet occurred and other monitoring well data in the vicinity are not indicative that the nitrate source is from infiltration operations, the trend in this well should be closely monitored. Installation of an upgradient well is suggested at this time in order to validate if the nitrate is potentially emanating from infiltration basins to the west.

7. The NDEP should consider expanding/updating guidance regarding infiltration basins to ensure critical elements for design and monitoring are consistently addressed during permitting process. Elements for consideration should include the proposed depth of the infiltration basins, the location and proximity of basins, monitoring well locations and screen intervals, sampling frequency, and any imposed compliance limits. Operational experience gained from the PIP should be utilized in the written guidance. Permit applications for infiltration facilities should provide characterization for the discharge water and any potential receiving groundwater, including depth to the groundwater. Applications should also include characterization for the receiving soils, both for expected percolation and geochemistry, to identify any constituents that may either attenuate or liberate due to the discharge water contact with alluvium. Projection of the anticipated infiltration water mound footprint and depth should also be considered when establishing compliance monitoring.

APPENDIX

1. Western Mining Action Project-Complaint & Request for Investigation, July 13, 2004
2. Tom Myers - Technical Memorandum, July 12, 2004
3. Water Pollution Control Permit NEV95111, effective April 26, 2004
4. Permit Fact Sheet, April 26, 2004
5. Plot Map – Pipeline Infiltration Project